

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 15 March 2001 (15.03.01)	
International application No. PCT/NO00/00227	Applicant's or agent's file reference P9933
International filing date (day/month/year) 28 June 2000 (28.06.00)	Priority date (day/month/year) 05 July 1999 (05.07.99)
Applicant BAEKKEN, Øistein et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

26 January 2001 (26.01.01)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

C. Cupello

Telephone No.: (41-22) 338.83.38



PATENTSTYRET
Styret for det industrielle rettsvern

NORSK GRANSKINGSRAPPORT
NORWEGIAN SEARCH REPORT

Patentsøknad nr.
Patent application no.

19993314

Kategori/ Category*	Anførte publikasjoner: Cited documents:	Relevant mot krav Relevant to claim(s)
	Ingen/None	
*Dokumentkategori: X: særlig relevant alene Y: særlig relevant dersom det kombineres med annet dokument i samme kategori A: bakgrunnsteknikk D: anført i beskrivelsen E: dokument med tidligere prioritet (PL § 2.2.3) &: publikasjon i samme patentfamilie		*Category of cited document: X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background D: document cited in the application E: earlier patent document, but published on, or after the filing date &: member of the same family

Rapport utferdiget/date of report: 1999.12.17

PATENT COOPERATION TREATY

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NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU


To:

SUNDNES, Arne
Norsk Hydro ASA
N-0240 Oslo
NORVÈGE

Date of mailing (day/month/year) 11 September 2000 (11.09.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P9933	
International application No. PCT/NO00/00227	
International publication date (day/month/year) Not yet published	
Applicant NORSK HYDRO ASA et al	International filing date (day/month/year) 28 June 2000 (28.06.00) Priority date (day/month/year) 05 July 1999 (05.07.99)

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
05 July 1999 (05.07.99)	19993314	NO	04 Augu 2000 (04.08.00)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer  Beatriz Morariu Telephone No. (41-22) 338.83.38
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PATENT COOPERATION TREATY

P9933 PCT

MOTTATT I N.H.
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10 SEPT 2000

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NOTIFICATION OF RECEIPT OF
RECORD COPY

(PCT Rule 24.2(a))

Til	Patentavd.	Saks behold.	From the Int. Bure.	Sign.	Exp.
	Alnæs				
	Anderson				
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SUNDNES, Arne
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International application No.
PCT/NO00/00227

Date of mailing (day/month/year) 11 September 2000 (11.09.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P9933	Besvart (dato)

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

NORSK HYDRO ASA (for all designated States except US)
BAEKKEN, Øistein et al (for US)

International filing date : 28 June 2000 (28.06.00)
Priority date(s) claimed : 05 July 1999 (05.07.99)
Date of receipt of the record copy
by the International Bureau : 04 August 2000 (04.08.00)

List of designated Offices :

AP : GH,GM,KE,LS,MW,MZ,SD,SL,SZ,TZ,UG,ZW
EA : AM,AZ,BY,KG,KZ,MD,RU,TJ,TM
EP : AT,BE,CH,CY,DE,DK,ES,FI,FR,GB,GR,IE,IT,LU,MC,NL,PT,SE
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MN,MW,MX,NO,NZ,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,US,UZ,VN,YU,ZA,
ZW

ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- ☒ time limits for entry into the national phase
☒ confirmation of precautionary designations
☐ requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer:

Beatriz Morariu

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22 JAN 2000

P99033 PCT

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NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To	Patentavd.	Saks bearb.	Sett	Eksp.
Alnæs				
Anderson				
Berg				
Dahl Sandbu				
Doorduyn				
Hammner				
Hartmann				
Kristiansen				
Kristiansen				
Lake-Sørensen				
Ricanek				
Sundnes				
Servant (date)				
Sign.				

From the INTERNATIONAL BUREAU

SUNDNES, Arne
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NORVEGE

Date of mailing (day/month/year)
11 January 2001 (11.01.01)

Applicant's or agent's file reference
P9933

IMPORTANT NOTICE

International application No.
PCT/NO00/00227

International filing date (day/month/year)
28 June 2000 (28.06.00)

Priority date (day/month/year)
05 July 1999 (05.07.99)

Applicant
NORSK HYDRO ASA et al

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

AU,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,
GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,
NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 11 January 2001 (11.01.01) under No. WO 01/01792

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

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(19) World Intellectual Property Organization
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- (26) Publication Language: **English**
- (30) Priority Data:
19993314 5 July 1999 (05.07.1999) NO
- (71) Applicant (*for all designated States except US*): **NORSK HYDRO ASA [NO/NO]; N-0240 Oslo (NO).**
- (72) Inventors; and
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- (81) Designated States (*national*): **AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.**
- (84) Designated States (*regional*): **ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).**
- Published:**
- *With international search report.*
 - *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **GELLED FEED PRODUCTS, MEANS FOR MAKING THE PRODUCTS AND METHOD FOR MANUFACTURE OF SAID PRODUCTS**

(57) Abstract: The present invention relates to gelled feed products, means for making said products and a method for manufacturing gelled feed products. The product comprises 80-98 weight% raw material of animal or marine origin pre-treated with KOH and/or NaOH, KHCO₃, K₂CO₃, NaHCO₃, Na₂CO₃, or (NH₄)₂CO₃ and 0.5-5 weight% alginate or pectin, a calcium source standard feed ingredients and calcium. The product may contain 0-10 weight% fish meal or carbohydrates. Said means are raw material of animal or marine origin pre-treated with alkali giving said raw material a pH of 8-12. The method comprises mixing raw materials of marine or animal origin, comprising offals, alginate or pectin, and a calcium source and standard feed ingredients, particulating said mixture into any useful geometrical shape, expose it to acid treatment in a bath. The raw material is pre-treated with alkali prior to addition of alginate or pectin. The resulting mixture is formed into desired shape and treated in an acid bath to form the gelled product. Preferably the acid bath is having a pH of 0.5-5.5 and the retention time in the bath is 30 seconds - 12 hours. The preferred acid is formic acid.

WO 01/01792 A1

"Gelled feed products, means for making the products and method for manufacture of said products"

The present invention relates to gelled feed products comprising raw material of animal or marine origin, including offals, 0.5-5 weight% alginate or pectin, a calcium source, standard feed ingredients such as proteins, lipids carbohydrates, vitamins, minerals, coloring agents etc. The invention further comprises a method for making said products and means for making the products.

The method comprises mixing raw materials of marine or animal origin, comprising offals, alginate or pectin and a calcium source and standard feed ingredients. Said mixture is particulated into any useful geometrical shape, whereupon it is exposed to acid treatment in a bath for performing gelling.

Gelled feed products are used in the fishfarming industry, but there have been several problems related both to the raw materials and the final product. The raw material has in practice been restricted to use of fresh or frozen fish and fish offals which have been minced before being mixed with the alginate. This means that preserved raw material has not been possible to use and thereby making the feed producer dependent on the availability of fresh raw material around the year, freezing capacity etc. Another problem relates to the pelletising step. The raw material contains a substantial amount of water and it has been necessary to add water binding agents in order to obtain pellets of required strength before they are introduced into the gelling bath. One way of solving this problem has been to add substantial quantities of meal, mainly wheat meal and fish meal. However, this will

dilute the feed and thereby reduce the relative amounts of desired components like fat and protein and make the content of carbohydrates too high to be optimal for the fish. On top of these problems, the addition of such water binding agents increases the costs of the feed.

The gelled wet feed of today has another limitation, it has to be used within a couple of days, possibly one week, after production, dependent on the temperature. Consequently, the feed has only been produced by fish farmers for immediate use. Freezing of pellets has been tested and this works, however, it is expensive and severe problems have arisen during thawing of the pellets.

There are several gelled feed products and processes for these described in the literature. Thus WO95/28830 describes an ambient-temperature process for making a water stable aquatic animal feed including fish and crustaceans. Feed ingredients alginate and fresh water are mixed into a slurry containing 0.5-10% alginate. The slurry is then exposed to divalent cations to form a water stable alginate gel which subsequently is formed into feed pellets. Preferably a controlled amount of air or nitrogen is whipped into the slurry before the gelling step in order to impart a pre-selected specific density of the pellets which are formed by conventional means such as slicing, chopping, spraying or low-pressure extruding at ambient temperature. Though high temperature, mixing and extruding prior to gelling are avoided and thereby loss of vitamins etc., the total process will be expensive and the final pelletising step complicates the process.

It is further known from Norwegian Patent No. 95894 to mix the feed ingredients in water and add a water soluble alginate, a calcium salt and a retardant like phosphate such that a gel like continuous mass is made. The wet feed ingredients and alginate mix are extruded into strings being fed into a gelling bath containing calcium chloride which reacts with the alginate to form a gelled feed.

From Norwegian Patent Application No. 910390 it is known a similar method for making feed having regulated structure and density. The feed ingredients are mixed with alginate and calcium carbonate and when an acid is added to this mixture carbon dioxide is released at the same time as the mixture is gelled. The problem of pelletising/extruding the feed is solved by pelletising when the mixture is only partly gelled and then let the pellets mature for some time before being used in order to obtain sufficiently strong pellets. This way of avoiding that the gel strength of the pellets is destroyed during pelletisation is difficult

to control and the final maturing step results in several production problems like reduced capacity, extra storage etc. before the pellets can be handled safely.

There is also known a commercial pelletised gelled wet feed called "Rubin Feed" described in <http://www.rubin.no>, a brochure from Stiftelsen Rubin, Pirsenteret, 7005 Trondheim, Norway, published August 1997. This feed comprises about 70% fish offals, about 10% fish oil, about 5% seaweed meal containing alginate, about 10% wheat meal, about 5% fish meal and minor amounts of vitamins, minerals, calcium carbonate and coloring agent. This feed is made from fresh fish/fish offals or frozen fish/fish offals. The dry ingredients are mixed and pelletised, whereupon the pellets are transported through a gelling bath containing weak formic acid. The feed can be stored for a few days. One disadvantage of this feed is that it is necessary to add wheat and fish meal (15%) in order to obtain required texture prior to pelletisation and gelling. Further, the raw materials are restricted to fresh/frozen fish/fish offals. Preserved fish can not be used.

The main object of the invention was to overcome the problems related to use of preserved raw material or fish silage and to reduce the need for water binding agents like carbohydrates and fish meal without reducing the texture of the feed product or pellet.

Another object was to preserve the end product to be able to store the feed pellets for at least 2-3 weeks.

A further object was to delete or reduce the amount of alginate in the product without reducing its gel strength.

It was also an object to obtain products having a high oil content which could be stored for a prolonged time without leaking out oil.

Finally, it was an object to obtain a raw material having reduced and acceptable level with respect to bacteria, virus, fungi and parasites and still be useful for producing a gelled product.

In order to solve the various problems stated above, the inventors started studying ways of treating the raw material in ways that would not prevent or reduce the effect of adding alginate and obtain at least the same consistency of the intermediate product during pelletisation and then gel the mixture to pellets having a firm texture and consistency and being substantially water-insoluble and free flowing. The preservative agent should also be compatible with the end use of the product. Preservation with acids like formic acid proved to give substantial problems during subsequent process steps. Previous attempts to produce pellets directly from minced fish by-products have failed. It proved difficult to achieve pellets with required texture by gelling techniques only since addition of alginate followed by gelling did not increase neither the viscosity nor the final texture sufficiently.

Addition of a water holding or absorbing agent such as extruded wheat and/or fish meal has therefore been considered necessary to facilitate pellet production with traditional pelletisers. It was therefore tried to simply increase the pH instead of decreasing the pH of the raw material and observe the effect on addition of alkali. Initial tests were then performed adding KOH to minced fish by-products.

This addition of KOH was surprisingly found to give the raw material a firmer texture and as the pH increased it seemed to increase the water holding capacity of the raw material to such an extent that there would hardly be any need for the conventional water binding agents. The feed mixture without feed meal could be pelletised without any need for gelling taking place in the mixer. In addition two beneficial effects were obtained in connection to the alginate behaviour. The alginate dissolved better at higher pH, and the alginate consumption due to gelling in the mixer was reduced since the Ca^{+} content was reduced. The amount of alginate available for the subsequent gelling process was therefore reduced. This gelling in an acid bath could then be performed resulting in pellets with improved consistency and being non-sticky and free flowing. Starting the gelling from a higher pH level gave a more effective gelling process. Based on the results and observations during the initial tests, more systematic experiments utilizing the concept for treating the raw material were started.

The raw materials to be treated within the concept comprise first of all fish offals and whole fish which usually are minced. Type of fish is not critical, this can be various types of cod fish, herring, capelin etc. Animal meat and animal offals can also be processed according to the invention when such raw materials are applicable as for instance in pet feed.

Useful additives for increasing the pH comprise KOH, NaOH, KHCO_3 , K_2CO_3 , NaHCO_3 , Na_2CO_3 , $(\text{NH}_4)_2\text{CO}_3$ and mixtures of these. Urea may also be added to the raw material in order to improve the preservative properties of the product.

It was found that raw material could be preserved for several months by bringing the pH to as much as pH 12. The preservation time will depend on the type of raw material and the pH chosen. Additional preserving components such as antioxidants, are applicable for improvement of the preservation.

The alginate component comprises any of several derivatives of alginic acid. Alginate is a family of unbranched binary copolymers of (1, 4) linked *b*-D-mannurinic acid (M) and α -L-guluronic acid (G) residues of widely varying composition and sequence. The term alginate used herein comprises any purification level, from technical grade alginate containing low amounts of alginate all the way through ultra purified grades, of a polymer with the chemical composition outlined above. The term alginate also comprises any natural occurring polymer, both from brown seaweeds and from bacterial origin, and enzymatically modified alginate.

It has also been found that pectin can be an applicable gelling agent.

The gelled product according to the invention can have any useful geometrical shape. Thus, the product can for instance be in the form of particles, pellets, strings and even large plates.

The scope of the invention and special features are as stated in the claims.

The gelled feed product according to the invention contains 80-98 weight% of fish or animal raw material pre-treated with KOH and/or NaOH, KHCO_3 , K_2CO_3 , NaHCO_3 , Na_2CO_3 or $(\text{NH}_4)_2\text{CO}_3$ and may contain 0-10 weight% fish meal or carbohydrates.

A special product is in the form of pellets with a diameter of 15 mm and has a gel strength of 100-400, measured as force in grams to compress the pellets 2 mm by a 25 mm cylinder.

The invention also comprises means for making the gelled product comprising raw materials of animal or marine origin, including offals, pre-treated with KOH and/or NaOH, KHCO_3 , K_2CO_3 , NaHCO_3 , Na_2CO_3 or $(\text{NH}_4)_2\text{CO}_3$ in amounts sufficient for giving said raw material a pH of 8-12.

The special features of the method according to the invention are that there is applied raw materials pre-treated with KOH and/or NaOH, KHCO_3 , K_2CO_3 , NaHCO_3 , Na_2CO_3 or $(\text{NH}_4)_2\text{CO}_3$ prior to addition of alginate or pectin, whereupon the resulting mixture is formed into desired shape and then treated in an acid bath to form the gelled product.

The applied acid bath can have a pH of 0.5-5.5.

The gelling in the bath can be performed for 30 seconds to 12 hours.

There can be applied an acid bath containing formic acid and/or mineral acids.

The calcium source can be added to the acid bath, preferably as CaCl_2 .

The invention will be further explained and elucidated in the following examples and figures.

Figure 1 shows water binding in raw material as function of added KOH.

Figure 2 shows gel strength of pellets as function of added alginate.

Figure 3 shows gel strength of pellets as function of pH and acid concentration of gelling bath.

Figure 4 shows gel strength of pellets as function of alginate concentration and KOH added.

Figure 5 shows gel strength of pellets as function of gelling time in 5% formic acid.

Figure 6 shows water binding in minced cattle hearts as function of % KOH.

Example 1

Minced herring was mixed thoroughly with KOH in amounts necessary to bring the pH of the mixture up to pH 10. Then a seaweed meal containing about 20% alginate, in amounts corresponding to 5 weight% in the final feed were also mixed with the raw materials. Feed ingredients like colour agents, vitamins, etc. were also mixed with the raw material at this stage and worked into the feed mixture until they all were well distributed and the alginate was dissolved. The mixture was then fed to a pelletiser and the formed feed strings were fed into a bath containing 4% formic acid. The pH of the acid bath was 2.0 and this started the gelling of the pellet. The extent of gelling was found to depend on the retention time in the bath and the pH. Already at a retention time of about a minute, strong pellets with a firm consistency were made. A parallel test was run on the same mixture except that no KOH was added prior to pelletisation. In this case the strings/pellets from the pelletiser had a much softer consistency, proper pellets were not formed, and the gelled product was also less firm than the product made with addition of KOH.

Example 2

This example shows the water binding effect of adding KOH to the raw material. The weighed fish, with and without addition of KOH was centrifuged at 23430G for 20 minutes at 20°C and subsequent to centrifugation the removed liquid, consisting of oil plus water, was recorded as % of the original weight of the raw material. The results of these experiments are shown in Table I and Figure 1.

Table I

Test	pH	Water + oil %
Without KOH	6.29	38.52
0.5% KOH	9.06	7.62
1.0% KOH	10.58	7.48
1.5% KOH	11.63	8.09
2.0% KOH	12.12	0

Addition of KOH proved to bind the water such that removed liquid dropped significantly already at an addition of 0.5% KOH. It was further observed that when KOH was added to the raw material the removed liquid contained only oil. When 2.0% KOH was added also the oil seemed to be bound as no liquid was removed during the centrifugation. Similar results were found when the raw material was treated with NaOH. The water binding effect of applying KOH or NaOH on the fish raw material can be utilized to pelletise the product ingredients into pellets with desired texture and firmness without being based on any gelling in the mixer. This improved water and oil binding property following KOH addition seems to result from water migration into the protein structure giving an increased viscosity and thus stabilizing the oil droplets. This result points towards the possibility of adding more oil to the feed without subsequent leakage.

Example 3

This example shows the variation in gel strength of the feed pellets as function of added alginate. The gelling was performed in 5% formic acid over night.

The gel strength was measured in the following way:

Instrument: TA-XT2 Texture analyzer
Probe: P/25A (25 mm aluminium cylinder with a flat surface)
Test speed: 0.1 mm/sec.
Distance: 2 mm compression.
The pellet's diameter was: 15 mm

The results are shown in Table II and Figure 2. In the figure the amount of alginate is stated as % alginate, in the form of sea weed meal containing about 20% alginate. Thus 5% alginate in the table corresponds to about 1% pure alginate. The gel strength is expressed as force in grams to obtain 2 mm compression of the pellet. Pellets according to the invention are compared with pellets of the com-

mercial "Rubin feed" containing 5% seaweed and 15% feed meal. To this latter feed no KOH was added, while the other new feed had been treated with 1%, respectively 2% KOH instead of adding feed meal.

Table II

Sample	% Alginate	pH pellet mixture	Gel strength	% KOH
1	1	10.11	111.7	1
2	3	9.86	276.4	1
3	5	9.69	401.8	1
4	1	11.86	111	2
5	3	11.51	203.4	2
6	5	11.3	287.6	2
Rubin Feed	5	6.38	297.58	0*
Rubin Feed	5	**	**	0**

* "Rubin Feed" contained 15% water binding meal.

** "Rubin Feed" without water binding meal. It was not possible to measure the gel strength because the mechanical property of the pellet was too poor.

From this experiment it can be seen that the amount of alginate can be reduced substantially compared to the known "Rubin Feed" without reducing the gel strength if the raw material has been treated with KOH.

Example 4

This example shows the effect of pH/acid concentration in the gelling bath on the gel strength of the pellets. The raw material had been treated with 2% KOH and the gelling time was 2 minutes. pH was measured on the surface of the pellets 24 hours after gelling. The gel strength was measured as stated in Example 3. The results of these experiments are shown in Table III and Figure 3.

Tabl III

Sample	Acid strength	pH pellet surface	Gel strength
1	1.1M HCl	10.5	168.5
2	10% HCOOH	10.5	193.0
3	15% HCOOH	10.6	218.7
4	20% HCOOH	8.3	241.8
5	30% HCOOH	6.3	359
6	50% HCOOH	5.1	400.6
7	0.3M Ca Cl ₂	11.7	*

* It was not possible to measure the gel strength because the mechanical property of the pellet was too poor.

From Table III and Figure 3 it can be seen that the gel strength increases substantially when the pH on the pellet surface decreases. Table III further shows that the pH of the gelling bath can be lowered to a very low value (down to zero) and still give stable and good results.

Example 5

This example shows the effect of added KOH to the fish raw material on the gel strength and the pH of the pellets. The results of these experiments are shown in Table IV and Figure 4.

Table IV

Sample	% KOH	pH pellet mix.	pH pellet inner core	pH surface	Gel strength
Rubin*	0	6.46			99.3
Rubin**	0	6.55	5.57	5.28	57.8
3	0.5%	8.08	6.46	5.93	58.7
4	1.0%	9.62	7.68	6.93	107.2
5	1.5%	10.35	8.49	8.69	94.4
6	2.0%	11.07	9.97	9.51	153.4
7	3.0%	12.24	11.17	10.56	113.3

* With 15% water binding meal

** Without any water binding meal

From these experiments it can be seen that the gel strength will increase with increasing pH of the raw material. Further, it is obvious that for the "Rubin Feed" the gel strength drops markedly when there is no feed meal present.

Example 6

This example shows the effect of gelling time on the gelling strength of the pellets. The experiments were performed on mixtures being treated with 2% KOH and the pH in the gelling bath was 2.0. The results of these experiments are shown in Table V and Figure 5.

Table V

Sample	Gelling time (min)	pH surface	pH inner core	Gel strength
1	4	9.9	10.4	194.5
2	6	9.5	9.8	188.8
3	10	8.7	8.9	194.8
4	15	8.1	9.0	213.3
5	30	6.6	7.4	299.1

These experiments show that the gel strength increases substantially when the gelling time is raised.

Example 7

This example shows the effect of adding an alkali when the raw material is minced animal meat and/or animal offals. Minced hearts of cattle, but without any water binding meal, was mixed with alginate, 1%, respectively 2% KOH was added. This mixture could be stored for a prolonged time or be introduced directly into a gelling bath containing calcium ions and formic acid. This experiment showed that addition of KOH resulted in binding of water in the same way as for fish raw material. Visual observation of the gelling process showed similar effect as for fish

raw material, resulting in non-sticking and non-soluble pellets. However, this specific type of raw material has a firmer initial texture than fish and also than other animal by-products. Accordingly, the gel strength was difficult to measure by the measuring method used in the above examples.

This type of animal feed is especially useful for pet food for cats, dogs etc.

Gel strength stated in the table as force in grams was measured for 2 mm compression in the same way as stated in Example 3. The results of this experiment are shown in Table VI and Figure 6.

Table VI

Sample	Gel strength	pH	% KOH	Water+oil %
1	138.5	5.87	0	22
2	151.5	10.98	1	0
3	142.9	12.56	2	0

By the present invention the inventors have succeeded in solving major problems related to different frequently used raw materials for gelled feed. Pellets having desired texture and gel strength have been obtained without diluting the product with water binding components like wheat or fish meal, as being done in the "Rubin Feed". The new product can also be made with a lower amount of alginate than usually without reducing the gel strength. Both the product and the intermediate means comprising raw material treated with alkali, can be stored for a prolonged time. Thus treated raw material was accordingly suitable for raw material for gelled products. The treatment also had a disinfective effect with respect to bacteria, virus, fungi and parasites. Accordingly, compared to any conventional known wet feed, major problems with these feeds, which have prevented them from being used in any large scale in industrial salmon fish farming, are solved by the invention.

Claims

1. Gelled feed product comprising raw materials of animal or marine origin, including offals, 0.5-5 weight% alginate or pectin, a calcium source, standard feed ingredients such as proteins, lipids, carbohydrates, vitamins, minerals, coloring agents etc.,
c h a r a c t e r i z e d i n t h a t
the product contains 80-98 weight% fish or animal raw material pre-treated with KOH and/or NaOH, KHCO_3 , K_2CO_3 , NaHCO_3 , Na_2CO_3 or $(\text{NH}_4)_2\text{CO}_3$.
2. Gelled feed product according to claim 1,
c h a r a c t e r i z e d i n t h a t
the product contains 0-10 weight% fish meal or carbohydrates.
3. Gelled feed product according to claim 1,
c h a r a c t e r i z e d i n t h a t
the product is pellets with a diameter of 15 mm and has a gel strength of 100-400, measured as force in grams to compress the pellets 2 mm by a 25 mm cylinder.
4. Means for making gelled feed products comprising raw materials of animal or marine origin, including offals, pre-treated with KOH and/or NaOH, KHCO_3 , K_2CO_3 , Na_2CO_3 , NaHCO_3 or $(\text{NH}_4)_2\text{CO}_3$ in amounts sufficient for giving said raw materials a pH of 8-12.

5. Method for manufacturing gelled feed products comprising mixing raw materials of marine or animal origin, comprising offals, alginate or pectin, and a calcium source and standard feed ingredients, particulating said mixture into any useful geometrical shape, whereupon it is exposed to acid treatment in a bath for performing gelling, characterized in that there is applied raw materials pre-treated with KOH and/or NaOH, KHCO_3 , K_2CO_3 , NaHCO_3 , Na_2CO_3 , or $(\text{NH}_4)_2\text{CO}_3$ prior to addition of alginate or pectin, whereupon the resulting mixture is formed into desired shape and then treated in an acid bath to form the gelled product.
6. Method according to claim 5, characterized in that there is applied an acid bath having a pH of 0.5-5.5.
7. Method according to claim 5, characterized in that the gelling in the acid bath is performed for 30 seconds to 12 hours.
8. Method according to claim 5, characterized in that there is applied an acid bath containing formic acid.
9. Method according to claim 5, characterized in that the calcium source is added to the acid bath, preferably as CaCl_2 .

1/3

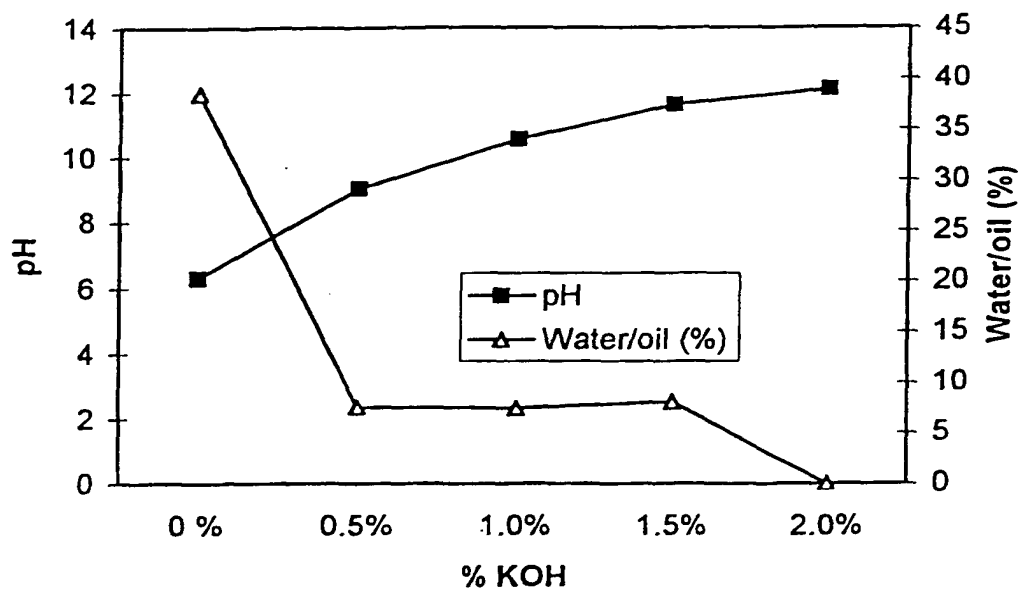
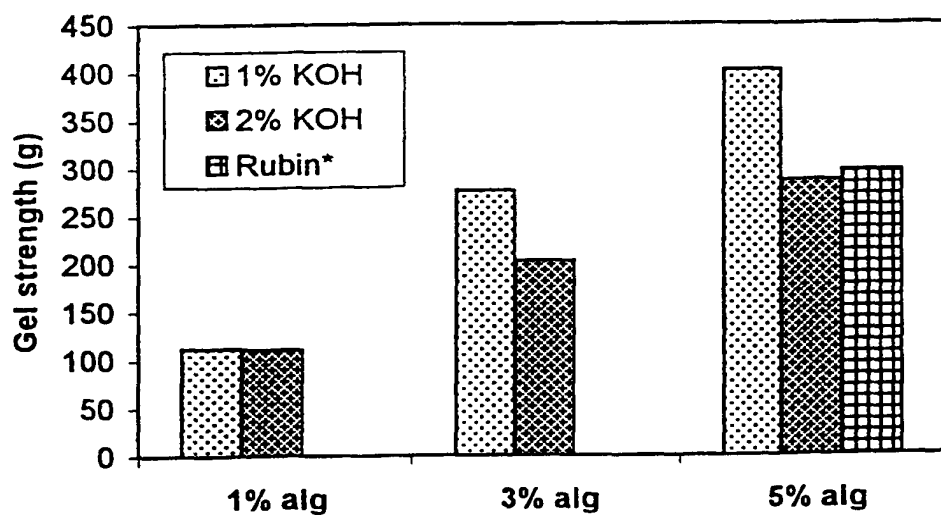


Fig. 1



* With 15% feed meal

Fig. 2

2/3

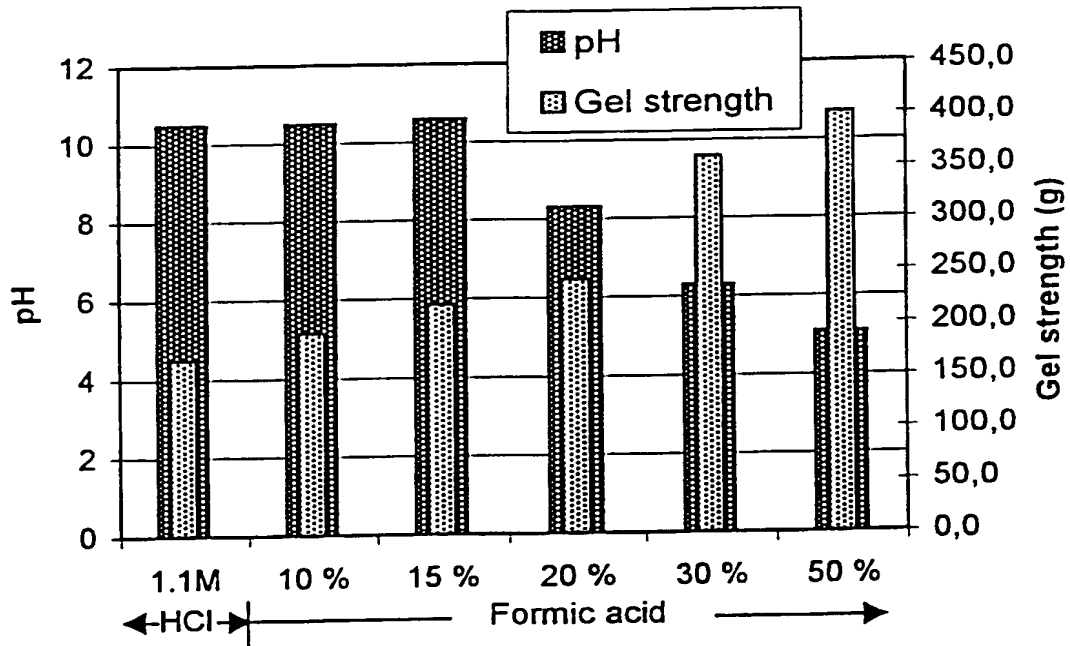


Fig. 3

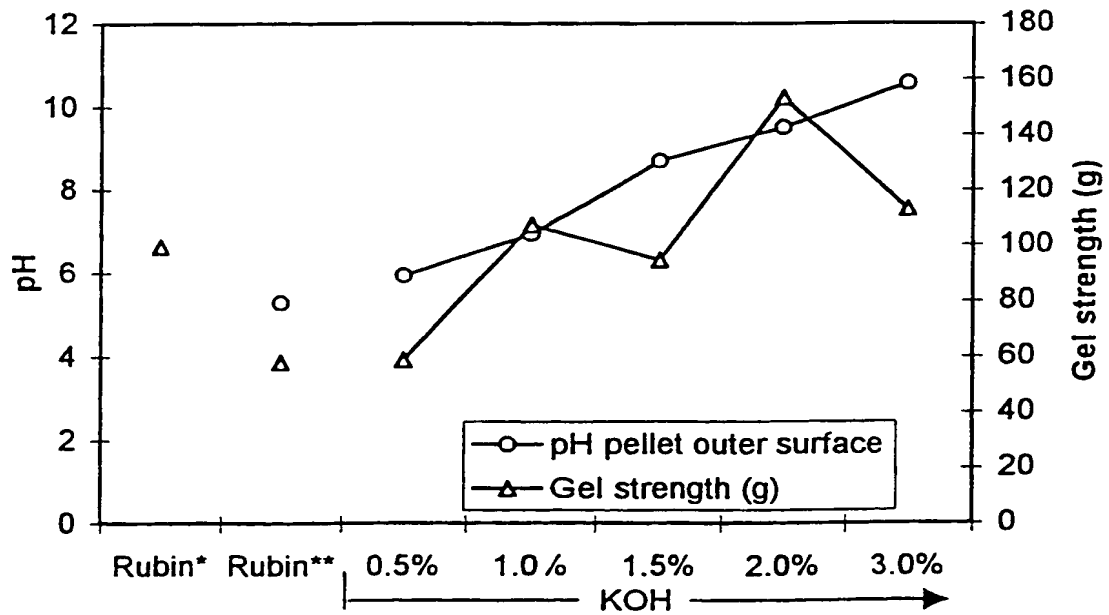


Fig. 4

3/3

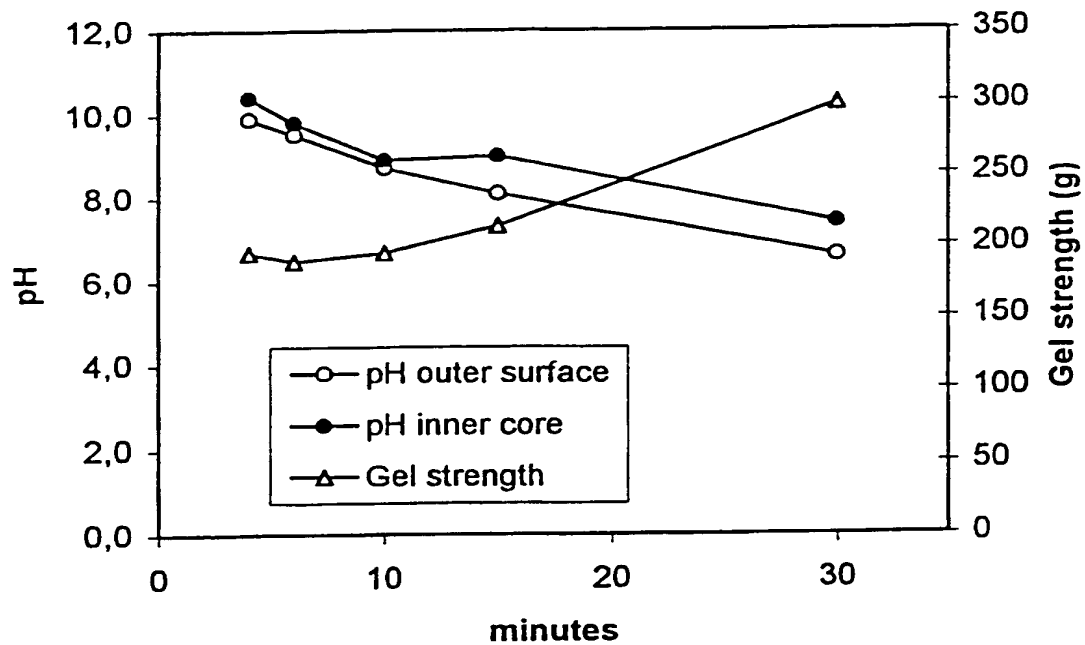


Fig. 5

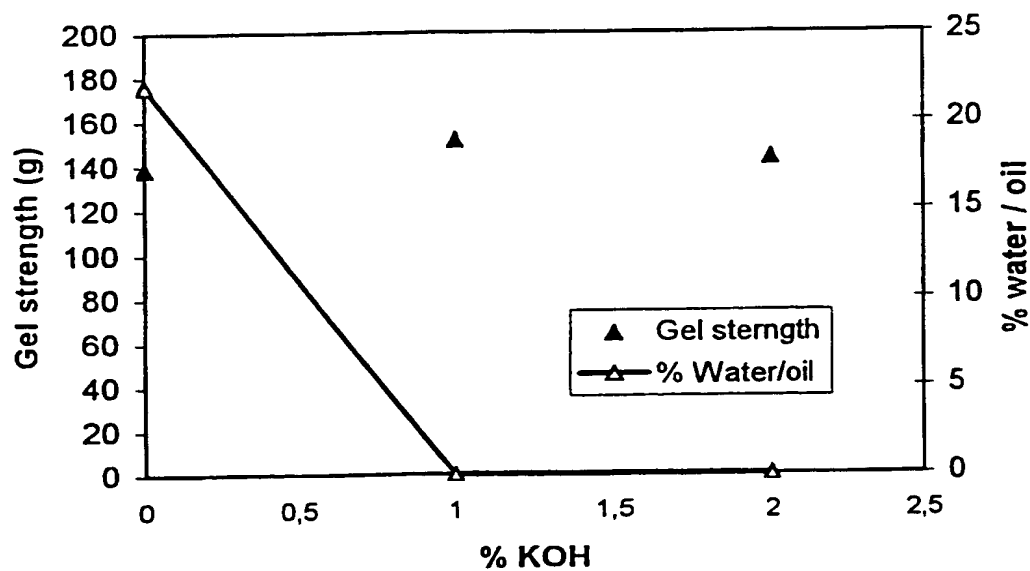


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO 00/00227

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A23K 1/18, A23L 1/325

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A23K, A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 63309166 A (NIPPON SUISAN KAISHA LTD) 1989-04-12 (abstract).(online)(retrieved on 2000-10-30). Retrieved from EPO PAJ Database --	1,4
X	JP 62055059 A (TECH RES ASSOC EXTRU COOK FOOD IND) 1987-08-14 (abstract). (online) (retrieved on 2000-10-30).Retrieved from EPO PAJ Database --	1,4
A	Food product development, 1970, T.R. Andrew et al, "application and control of the algin-calcium reaction", page 99 - page 104 --	3,5-9

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

31 October 2000

Date of mailing of the international search report

06 - 11 - 2000

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

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Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO 00/00227

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5783241 A (GILLES BOCABEILLE ET AL), 21 July 1998 (21.07.98), column 8 --	3,5-9
A	US 4935250 A (JAMES P. COX ET AL), 19 June 1990 (19.06.90), column 2, line 5; column 8, line 20 - line 24 -- -----	9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

03/10/00

PCT/NO 00/00227

US	5783241	A	21/07/98	EP	0697176	A	21/02/96
				FR	2723684	A,B	23/02/96
<hr/>							
US	4935250	A	19/06/90	AU	4297785	A	28/11/85
				DK	1486	A	03/03/86
				EP	0181885	A	28/05/86
				FI	855201	A	31/12/85
				JP	61502025	T	18/09/86
				KR	8802187	B	17/10/88
				NO	163551	B,C	12/03/90
				NO	855344	A	30/12/85
				NZ	211929	A	30/05/88
				PH	25407	A	01/07/91
				WO	8505015	A	21/11/85
				ZA	8503178	A	24/12/85

REC'D 10 OCT 2001

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P9933	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/NO00/00227	International filing date (day/month/year) 28/06/2000	Priority date (day/month/year) 05/07/1999
International Patent Classification (IPC) or national classification and IPC A23K1/18		
Applicant NORSK HYDRO ASA et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 26/01/2001	Date of completion of this report 05.10.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Vermeulen, S Telephone No. +49 89 2399 7520



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NO00/00227

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-13 as originally filed

Claims, No.:

1-9 as originally filed

Drawings, sheets:

1-3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/NO00/00227

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1,2,3,5,6,7,8,9
	No:	Claims	4
Inventive step (IS)	Yes:	Claims	1,2,3,5,6,7,8,9
	No:	Claims	4
Industrial applicability (IA)	Yes:	Claims	1-9
	No:	Claims	

2. Citations and explanations
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/NO00/00227

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: JP 63-309166-A (Nippon Suisan Kaisha Ltd), 16-12-1988
- D2: JP 62-055059-A (Tech Res Assoc Extrud Cook Food Ind.), 10-03-1987
- D3: 'Application and control of the algin-calcium reaction', 'T.R. ANDREW ET AL.', 'FOOD PRODUCT DEVELOPMENT', "/00-00-1970, 99-104,
- D4: US-A-5783241
- D5: US-A-4935250

NOVELTY - INVENTIVE STEP

Claims 1-3 and 5-9

The claimed gelled feed product and the method for producing said product both meet the novelty requirement of the PCT (Art.33(2)), since none of the prior art documents discloses subject-matter falling within the definition of said claims.

In addition the prior art contains no indications which would lead to the subject-matter as claimed in present claims 1-3 and 5-9. Accordingly said claims also involve an inventive step (Art.33(3) PCT).

D1 discloses a fish paste product and a process to produce the same. Said product is not gelled, on the contrary it contains an enzyme inhibiting gel formation. A part of the raw material contained in the product consists of denaturated proteins, i.e. raw material treated with acids or alkali followed by neutralisation.

D2 discloses a meat product based on fish or shellfish meat, said meat product having a cattle meat like texture. To achieve said texture fish meat is treated with alkali to adjust the pH to 9.5, then passed through a cooking extruder and finally treated with an acid to neutralize or acidify the product.

D3 deals with the alginate-calcium reaction in the production of a gel.

D4 concerns fruit and vegetables restored in the form of a gel.

D5 discloses fish feed pellets coated with gellified alginate or guar gum. Although the pellets themselves may also contain settable gel material (**col3, lin1-15**), they differ from the present invention since they are based on fishmeal mixed with water to form a dough which is subsequently formed into a pellet. The final product contains less than 80% fish or animal raw material, which is furthermore not treated with alkali.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/NO00/00227

Claim 4

The subject-matter of Claim 4 concerns an intermediate product suitable for making gelled feed products (cf. "means" for making gelled feed products). The claimed intermediate product comprises raw materials of animal or marine origin, including offals, pre-treated with alkali (specified in the claim) in amounts sufficient for giving said raw materials a pH of 8-12. Said intermediate product cannot be novel over document **D2 (abstract)**, which discloses a process wherein an intermediate product is obtained which falls within the definition of present Claim 4:

"fish or shellfish meat is treated with sodium hydroxide to adjust the pH thereof to ≥ 9.5 "

Although the obtained intermediate product in D2 is not further processed into a gelled feed product, this does not prevent D2 to take away the novelty of Claim 4. Since the claimed subject-matter is not novel, no inventive step can be seen as well (Art. 33(2)-(3) PCT).

INDUSTRIAL APPLICABILITY

The subject-matter of Claims 1-9 meets the requirement of Art. 33(4) PCT.

PATENT COOPERATION TREATY

P99033 PCT

Frist: 26.09.01

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
SUNDNES, Arne
Norsk Hydro ASA
N-0240 Oslo
NORVEGE

MOTTATT I N.H.
PATENTAVD.
30 JUL 2001

To	Patentavd.	Saks behold.	Sett	Ersp.
	Alnæs			
	Anderson			
	Berg			
	Dahl Sandbu			
	Doorduin			
	Hammer		X	CMH
	Hanshaugen			
	Hofseth			
	Hovland			
	Johnsen			
	Kristiansen			
	Lokke-Sørensen			

PCT

WRITTEN OPINION

(PCT Rule 66)

Received Date of mailing
26.07.2001

Applicant's or agent's file reference
P9933

REPLY DUE within 2 month(s)
from the above date of mailing

International application No.
PCT/NO00/00227

International filing date (day/month/year)
28/06/2000

Priority date (day/month/year)
05/07/1999

International Patent Classification (IPC) or both national classification and IPC
A23K1/18

Applicant
NORSK HYDRO ASA et al.

- This written opinion is the **first** drawn up by this International Preliminary Examining Authority.
- This opinion contains indications relating to the following items:
 - ☒ Basis of the opinion
 - ☐ Priority
 - ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - ☐ Lack of unity of invention
 - ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - ☐ Certain document cited
 - ☐ Certain defects in the international application
 - ☐ Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 05/11/2001.

Name and mailing address of the international preliminary examining authority:

 European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer / Examiner

Vermeulen, S

Formalities officer (incl. extension of time limits)

Longo, E
Telephone No. +49 89 2399 8141



I. Basis of the opinion

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"*):

Description, pages:

1-13 as originally filed

Claims, No.:

1-9 as originally filed

Drawings, sheets:

1-3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

WRITTEN OPINION

International application No. PCT/NO00/00227

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement
- | | | |
|-------------------------------|--------|---|
| Novelty (N) | Claims | 4 |
| Inventive step (IS) | Claims | 4 |
| Industrial applicability (IA) | Claims | |

2. Citations and explanations
see separate sheet

**WRITTEN OPINION
SEPARATE SHEET**

International application No. PCT/NO00/00227

R l t m V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: JP 63-309166-A (Nippon Suisan Kaisha Ltd), 16-12-1988
D2: JP 62-055059-A (Tech Res Assoc Extru Cook Food Ind.), 10-03-1987

1. Independent claim 1, 5 & dependent claims 2-3, 5-9

The subject-matter of said claims meets the requirements of Article 33(1)-(3) PCT.

2. Independent claim 4

The subject-matter claimed can be summarized to *raw materials of animal or marine origin, including offals, pre-treated with specific alkali in amounts sufficient for giving the raw material a pH of 8-12*. Raw materials of animal/marine origin are well known in the art. It is also commonly known to treat such materials with acids or alkali. Documents **D1** and **D2** disclose alkali treatment of raw materials of animal/marine origin. Accordingly the claimed raw materials cannot be novel nor inventive over prior art documents **D1** and **D2**. The fact that the claimed raw materials are *used* for a new and inventive *purpose* (i.e. making gelled feed products) does not render the *materials themselves* novel and inventive.

It is at present not clear which part of the application could serve as a basis for a new material claim which meets the requirements of Article 33(1)-(3) PCT.

In order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly identify the amendments carried out, no matter whether they concern amendments by addition, replacement or deletion, and to indicate the passages of the application as filed on which these amendments are based (see also Rule 66.8(a) PCT).

If the applicant regards it as appropriate these indications could be submitted in handwritten form on a copy of the relevant parts of the application as filed.

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) P9933

Box No. I TITLE OF INVENTION

"Gelled feed products, means for making the products and method for manufacture of said products"

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

NORSK HYDRO ASA
N-0240 Oslo
Norway

☐ This person is also inventor.

Telephone No.
+47 22432100

Facsimile No.
+47 22432308

Teleprinter No.

State (that is, country) of nationality:
NO

State (that is, country) of residence:
NO

This person is applicant for the purposes of:

☐ all designated States

☒ all designated States except the United States of America

☐ the United States of America only

☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

BÆKKEN, Øistein
Port Arthur 5
N-7014 Trondheim
Norway

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
NO

State (that is, country) of residence:
NO

This person is applicant for the purposes of:

☐ all designated States

☐ all designated States except the United States of America

☒ the United States of America only

☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

SUNDNES, Arne
Norsk Hydro ASA
N-0240 Oslo
Norway

Telephone No.
+47 22432316

Facsimile No.
+47 22432308

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SMIDSRØD, Olav
Bromstadekra 45
N-7046 Trondheim
Norway

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
NO

State (that is, country) of residence:
NO

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

DRAGET, Kurt Ingar
Solvollveien 21B
N-7046 Trondheim
Norway

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
NO

State (that is, country) of residence:
NO

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

JOHNSEN, Freddy
Grenseveien 28
N-1927 Rånåsfoss
Norway

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
NO

State (that is, country) of residence:
NO

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ **AP** **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA** **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA** **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line).

- | | |
|---|---|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MA Morocco |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- ☐
- ☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 05 July 1999 (05.07.99)	19993314	NO		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA)
(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

Number

Country (or regional Office)

ISA / SE

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request : 4

description (excluding sequence listing part) : 13

claims : 2

abstract : 1

drawings : 3

sequence listing part of description : _____

Total number of sheets : 23

This international application is accompanied by the item(s) marked below:

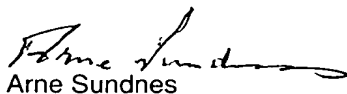
1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☐ other (specify):

Figure of the drawings which should accompany the abstract: 1

Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).


Arne Sundnes

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA /		6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

For International Bureau use only
Date of receipt of the record copy by the International Bureau: